

REMARKS

The foregoing Amendment and remarks which follow are responsive to the Office Action dated February 24, 2006, in which the Examiner rejected Claims 1-4, 7, 11-16, and 20, and objected to Claims 5, 6, 8-10, and 17-19. More particularly, Claims 1-3 and 7 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 5,497,032 to Tsuji, et al. (hereinafter "TSUJI"). Claims 11-13 and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over TSUJI in view of U.S. Pat. No. 6,696,752 to Su, et al. (hereinafter "SU"). Claims 4 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over TSUJI in view of U.S. Pat. No. 6,552,421 to Kishimoto, et al. (hereinafter "KISHIMOTO"). Claims 14 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over TSUJI in view of SU, and in further view of KISHIMOTO. The remaining Claims 5, 6, 8-10, and 17-19 were objected to as being dependent on a rejected base claim, but indicated by the Examiner to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant gratefully acknowledges the Examiner's indication of allowable subject matter in Claims 5, 6, 8-10, and 17-19. However, for the following reasons, Applicant respectfully submits that all of the pending Claims 1-20 are now in condition for allowance.

1. *Amended Independent Claim 1 is not Anticipated by TSUJI*

In the Office Action, the Examiner rejected independent Claim 1 as being anticipated by TSUJI, asserting that TSUJI teaches an interposer comprising an interposer body having opposed top and bottom surfaces, a die pad, and a plurality of electrically conductive interposer leads embedded within the top surface of the interposer body and at least partially exposed therein.

In Figure 3C highlighted by the Examiner, TSUJI appears to disclose a semiconductor device 31c including a lead frame 45 embedded within refractory glass layers 46 and 46A, as well as a crystallized glass layer 48. The glass layers 46 and an aluminum film 42 applied thereto are supported by a ceramic base 41, with a cap 49 being applied to the glass layers 46A, 48. The cap 49 also covers a semiconductor chip 44 which is mounted to

the aluminum film 42 by an adhesive 43 and electrically connected to the lead frame 45 by wires 47.

Claim 1 has been amended to recite, in pertinent part, the feature of “...*each of the interposer leads defining an exposed land which is substantially contiguous with the bottom surface of the interposer body.*” In the semiconductor device 31c shown in Figure 3C of TSUJI, the “land” of any lead within the lead frame 45 is defined by the bent portion of such lead which protrudes outwardly from the glass layers 46, 46A. Clearly, any such land defined by those portions of the leads of the lead frame 45 which are exposed in the semiconductor device 31c are not *substantially contiguous* with the bottom surface of any glass layers 46. Even assuming, arguendo, that the portion of each lead of the lead frame 45 which is exposed between the glass layers 46 or between the glass layers 46A, 48 defines a “land” which the Examiner appears to assert in the subject Office Action, such land is also clearly not *substantially contiguous* with the bottom surface of any glass layers 46.

Thus, based on the foregoing, Applicant respectfully submits that independent Claim 1 as amended is not anticipated by TSUJI, and is in condition for allowance. Additionally, Applicant respectfully submits that Claims 2-10 are also in condition for allowance as being dependent upon an allowable base claim, Claims 5, 6 and 8-10 having been merely objected to by the Examiner as indicated above.

2. *Amended Independent Claim 11 is not Rendered Obvious by TSUJI and SU*

In the Office Action, the Examiner rejected independent Claim 11 as being unpatentable over TSUJI in view of SU, asserting that TSUJI teaches all of the features recited in Claim 11, except for the feature relating to the adhesive tape layer attached to the top surface of the die pad. The Examiner asserted that SU teaches an adhesive tape layer attached to the top surface of a die pad, and concluded that it would have been obvious to combine such teachings with TSUJI to result in the invention as recited in Claim 11.

The pertinent teachings of TSUJI have been described above. SU teaches a semiconductor device comprising a lead frame 2 which includes a die pad 20 and a plurality of leads 21. Attached to the top surface 201 of the die pad 20 is a semiconductor chip 3. In SU, the attachment of the semiconductor chip 3 to the top surface 201 of the die pad 20 is

described as being accomplished through the use of an adhesive such as a silver paste or an adhesive tape. SU further teaches a tape 8 which is attached to the bottom surface 202 of the die pad 20 and the bottom surfaces 212 of the leads 21 so that a gap 22 normally defined between the inner ends of the leads 21 and the peripheral edge 200 of the die pad 20 is covered or tightly sealed by the tape 8.

Claim 11 has been amended to recite, in pertinent part, the features of “...*a layer of adhesive tape having a first surface attached to the top surface of the die pad and extending along the peripheral edge thereof...and a plurality of electrically conductive interposer leads attached to a second surface of the adhesive tape which is opposite the first surface...*” In the subject Office Action, the Examiner makes specific reference to the disclosure in SU at column 4, lines 8-10 to support the adhesive tape layer teaching thereof. This particular passage of the specification of SU pertains only to the potential use of adhesive tape to facilitate the attachment of the semiconductor chip 3 to the top surface 201 of the die pad 20 as shown in Figure 1 of SU. Applicant respectfully submits that the hypothetical combination of these teachings of SU to the semiconductor device 31c shown in Figure 3C of TSUJI would result in the modification of the semiconductor device 31c in a manner wherein the adhesive 43 of silver glass is substituted with adhesive tape to facilitate the mounting of the semiconductor chip 44 to the aluminum film 42. Applicant respectfully submits that this resultant combination falls well short of teaching the features of Claim 11 highlighted above.

Nor is there any teaching or suggestion in TSUJI which supports any hypothetical modification of semiconductor device 31c to substitute any of the glass layers 46 with a layer of adhesive tape to effectively secure the leads of the lead frame 45 to the aluminum film 42. Along these lines, any attempted reliance upon the tape 8 of SU rather than the adhesive tape used to secure the semiconductor chip 3 to the die pad 20 does not overcome this deficiency, the TSUJI reference simply being devoid of any teaching or suggestion which supports any hypothetical modification thereof to substitute any of the glass layers 46 with a layer of adhesive tape as indicated above. Indeed, considering that the tape 8 in SU is specifically shown and described as being attached to the bottom surfaces of both the die pad 20 and leads 21 solely for purposes of covering the gaps 22 defined between the die pad 20 and

leads 21, there would be absolutely no motivation to incorporate such tape 8 into the semiconductor device 31c of TSUJI since the existing aluminum film 42 effectively spans or covers the spaces or gaps which are defined between the semiconductor chip 44 and the leads of the lead frame 45. Still further, considering the explicit teachings of SU, there would be no motivation to hypothetically modify the structure of the semiconductor device shown in Figure 1 to facilitate the attachment of the die pad 20 and leads 21 to *opposite* first and second surfaces of the tape 8 rather to the common surface as shown and described in SU.

Thus, based on the foregoing, Applicant respectfully submits that independent Claim 11 as amended is not rendered obvious by the combination of TSUJI and SU, and is in condition for allowance. Additionally, Applicant respectfully submits that Claims 12-19 are also in condition for allowance as being dependent upon an allowable base claim, Claims 17-19 only having been objected to by the Examiner as indicated above.

3. *Amended Independent Claim 20 is not Rendered Obvious by TSUJI and KISHIMOTO*

In the Office Action, independent Claim 20 was rejected as being unpatentable over TSUJI in view of KISHIMOTO. In rejecting Claim 20, the Examiner stated that TSUJI shows most aspects of the invention except a “bottom terminal surface which is generally coplanar with the bottom surface of the die pad”, such feature being disclosed in KISHIMOTO

Similar to Claim 1, independent Claim 20 has been amended to recite, in pertinent part, the feature of “...*the bottom terminal surface being substantially contiguous with the non-conductive barrier means.*” As argued above in relation to Claim 1, in the semiconductor device 31c shown in Figure 3C of TSUJI, any “land” defined by any lead within the lead frame 45 is not *substantially contiguous* with the bottom surface of any glass layers 46 or other non-conductive barrier. This deficiency is not remedied by KISHIMOTO, Figure 1 of which (highlighted by the Examiner) shows nothing more than a lead 5 which defines a land disposed outside of a package body 2 and spaced from the peripheral edge of a die pad 3 which is partially embedded within the package body.

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Thus, based on the foregoing, Applicant respectfully submits that independent Claim 20 as amended is not rendered obvious by the combination of TSUJI and KISHIMOTO, and is in condition for allowance.

4. Conclusion

On the basis of the foregoing, Applicant respectfully submits that each and every pending claim of the present invention meets the requirements for patentability and respectfully requests that the Examiner indicate the allowance of Claims 1-20 of the present application. An early Notice of Allowance is therefore respectfully requested.

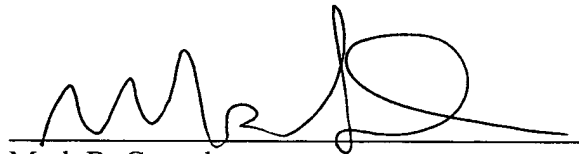
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Respectfully submitted,

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